

SPUT

Dart Aerospace Ltd.

Date: Monday, 18/08/2008 10:26:53 AM
User: Julie Lecocq

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services
Job Number : 41287
Estimate Number : 12882
P.O. Number :
This Issue : 18/08/2008 S.O. No. :
Prsht Rev. : NC
First Issue : / / Type : MACHINED PARTS
Previous Run : 35404

Drawing Name : ARM

Part Number : D3560042
Drawing Number : D3560 REV D
Project Number : N/A
Drawing Revision : D
Material :
Due Date : 10/09/2008

Qty: 10 Um: Each

Written By :

Checked & Approved By :

Comment :

Est Rev:A New Issue 07.05.24 EC
est rev B ECN 987 07.10.09 EC verified by: DD
Est Rev:C ECN1048 07-12-18 DD verified by: EC

Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0

M6061T6B0500X05000

6061-T6 Bar .500 x 5.00



Comment: Qty.: 1.4648 f(s)/Unit Total: 14.6475 f(s)

6061-T6 Bar 0.50" x 5.00"

Batch: M109025/ not in computer

2.0

BAND SAW

BAND SAW



Comment: BAND SAW

Cut blanks 16.750" long

3.0

HAAS1

HAAS CNC VERTICAL MACHINING #1



Comment: HAAS CNC VERTICAL MACHINING #1

1- Mill as per Folio FA694 Rev: AA & Dwg D3560 Rev: D

2-C'sink 0.196" hole on manual mill as per dwg D3560

3-Deburr per dwg D3560

4.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

Date: Monday, 18/08/2008 10:26:53 AM
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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: ARM

Job Number: 41287

Part Number: D3560042

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

QC8

SECOND CHECK



Comment: SECOND CHECK

SA 08/09/02 (10)

6.0

D35921

Plate



Comment: Qty.: 1.0000 Each(s)/Unit Total: 10.0000 Each(s)

PLATE

B 41083 V SP 08.09.02. (4X)

7.0

LARGE FAB 1

LARGE FABRICATION RESOURCE 1



Comment: LARGE FABRICATION RESOURCE 1

1-Weld assembly as per dwg D3560

STEP:

- 1- clean material (buff bracket and bottom of arm with blue pad) SP
- 2- set up bracket and arm on jig SP
- 3- preheat bracket and arm with torch SP
- 4- clean before welding with brush SP
- 5- set up machine to 135 amps SP
- 6- weld across bottom and top ends SP
- 7- reheat with torch (65 deg C) SP
- 8- on one side weld from bottom to top half way SP
- 9- same for other side (half way) SP
- 10- from half way point weld the rest of the first side (ease off pedal near end) SP
- 11- same for remaining side (ease off pedal near end) SP

SA 08/09/02 (4X)

8.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

9.0

QC9

VISUAL WELDING INSPECTION



Comment: VISUAL WELDING INSPECTION

SA 08/09/05

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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: ARM

Job Number: 41287

Part Number: D3560042

Job Number:



Seq. #:

Machine Or Operation:

Description :

10.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

11.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

12.0

D2808

Bushing



Comment: Qty.: 1.0000 Each(s)/Unit Total : 10.0000 Each(s)
Spacer

13.0

SMALL FAB 1

SMALL & MEDIUM FAB RESOURCE 1



Comment: SMALL & MEDIUM FAB RESOURCE 1

1-Press bushing in D3560 arm per dwg D3562

14.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

15.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: _____

16.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE



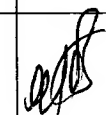

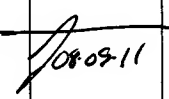
Job Completion



W 08.09.18

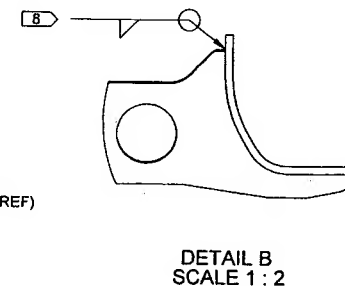
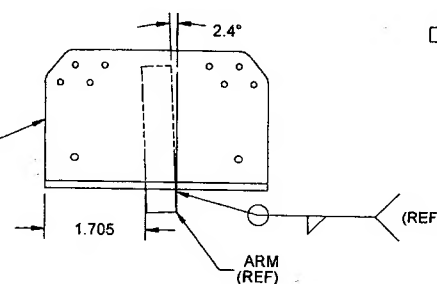
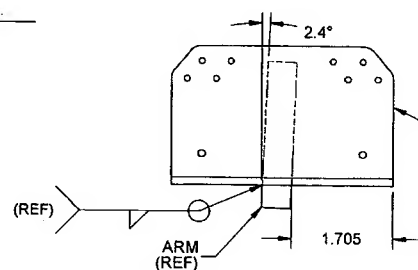
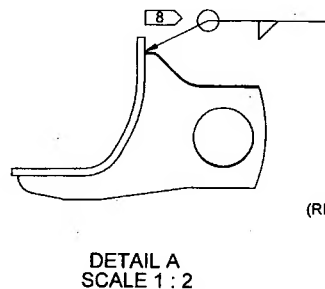
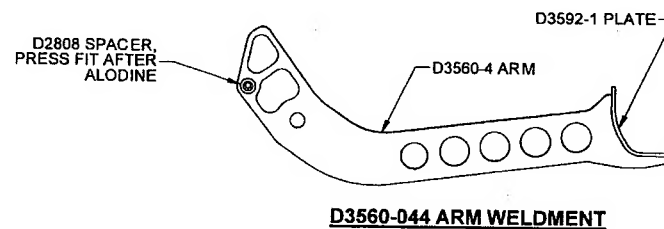
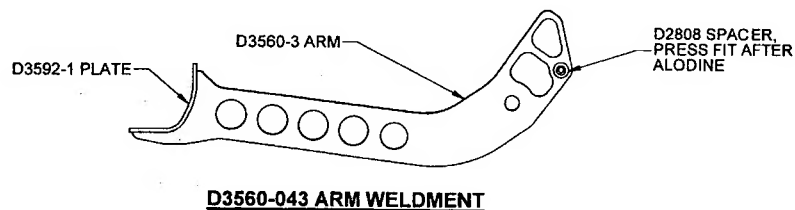
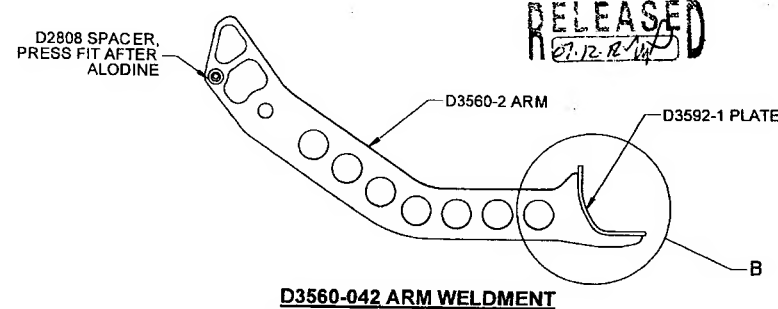
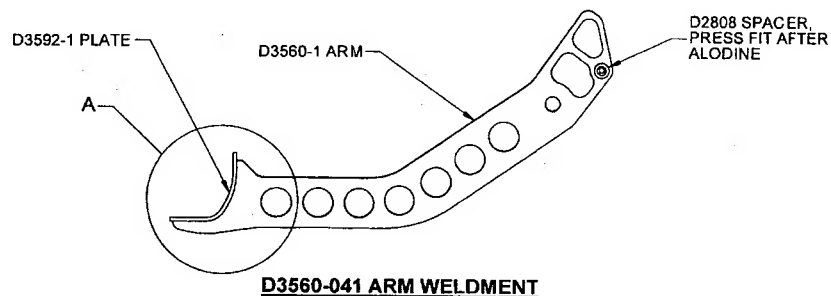
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D3560-042 PAR #: N/A Fault Category: Prod / Prod. LG NCR: Yes No DQA: A Date: 08/05/15
 Resolution: Scrap Disposition: CAR 08-026 QA: N/C Closed: D Date: 08/09/15

NCR: <u>41287-2</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
8/9/15	#7.0	During welding inspection it was found that 2 parts have cracks in the D3592-1 plates from welding	 08/09/15	Scrap and destroy QTY (42) As per email from David Shepherd to Alan Stocker on 8/9/15 @ 1:36 pm	SAD 08/09/17	 08/09/17	 08/09/15	 08/09/15
		R.C. Grain runs along the weld.		no Repkex See CAR 08-026	 08/09/11			

NOTE: Date & initial all entries

RELEASED
07.12.16



PARTS LIST

QTY -041	QTY -042	QTY -043	QTY -044	P/N	DESCRIPTION
X				D3560-041	ARM WELDMENT
	X			D3560-042	ARM WELDMENT
		X		D3560-043	ARM WELDMENT
			X	D3560-044	ARM WELDMENT
1	1	1	1	D2808	SPACER
1				D3560-1	ARM
	1			D3560-2	ARM
		1		D3560-3	ARM
			1	D3560-4	ARM
1	1	1	1	D3592-1	PLATE

NOTES:

- 1) MATERIAL: N/A
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
- 6) IDENTIFICATION: N/A
- 7) WEIGHT: 1.23 lbs (TYP)
- 8) WELDING: PER DART QSI 004

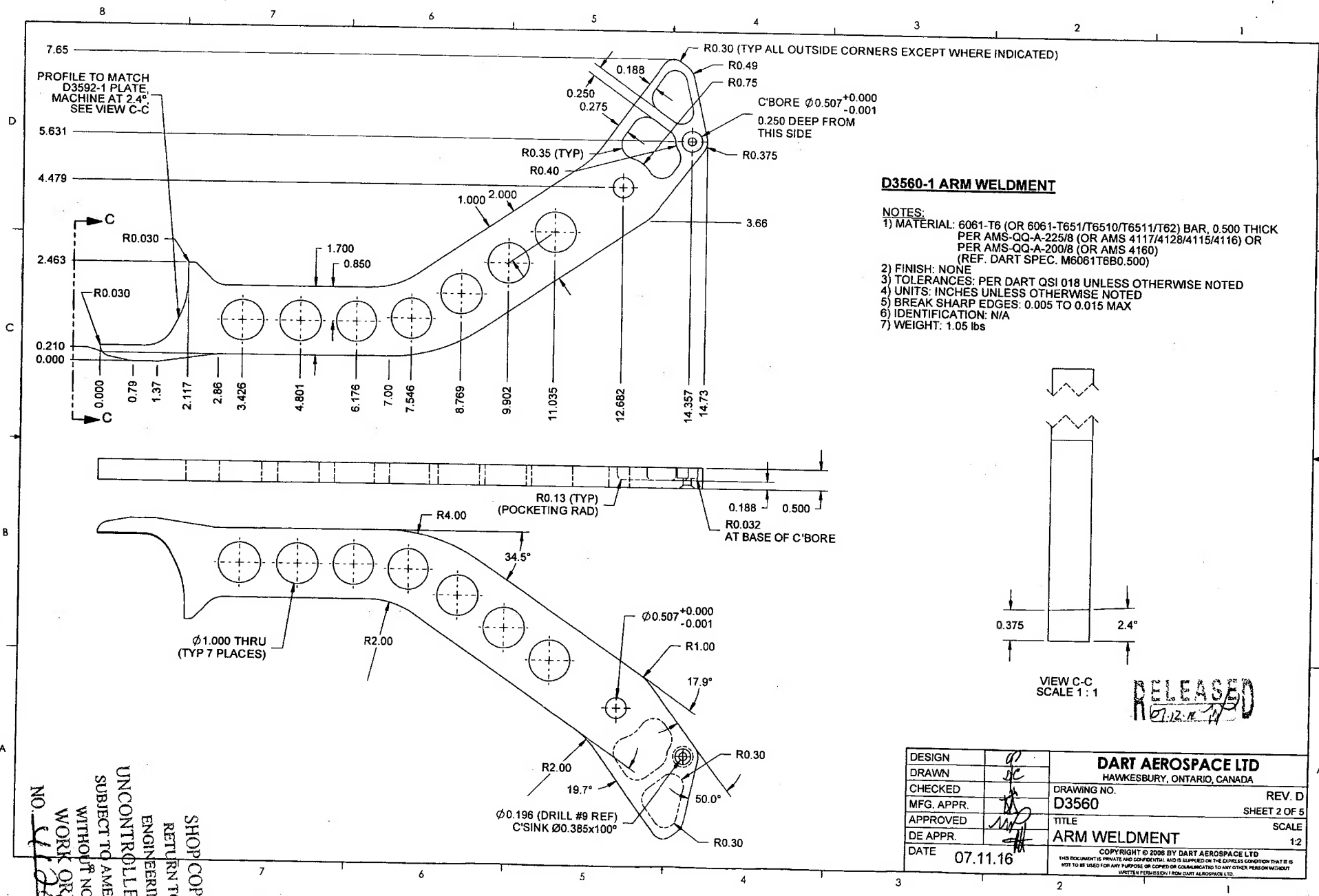
D	ADD D2808 PRESS FIT NOTE; REDRAWN IN SOLIDWORKS	DC	07.11.16
C	REMOVE POWDER COAT	CP	07.06.19
B	REDESIGN AS WELDMENT, ADD POCKETS	CP	07.01.15
A	NEW ISSUE	CP	08.09.25
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	07.11.16		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. **D3560** REV. D
TITLE **ARM WELDMENT** SCALE 1:4
SHEET 1 OF 5

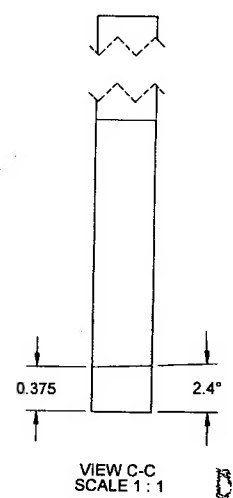
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WORK ORDER
NO 41287
SUBJECT TO AMENDMENT



D3560-1 ARM WELDMENT

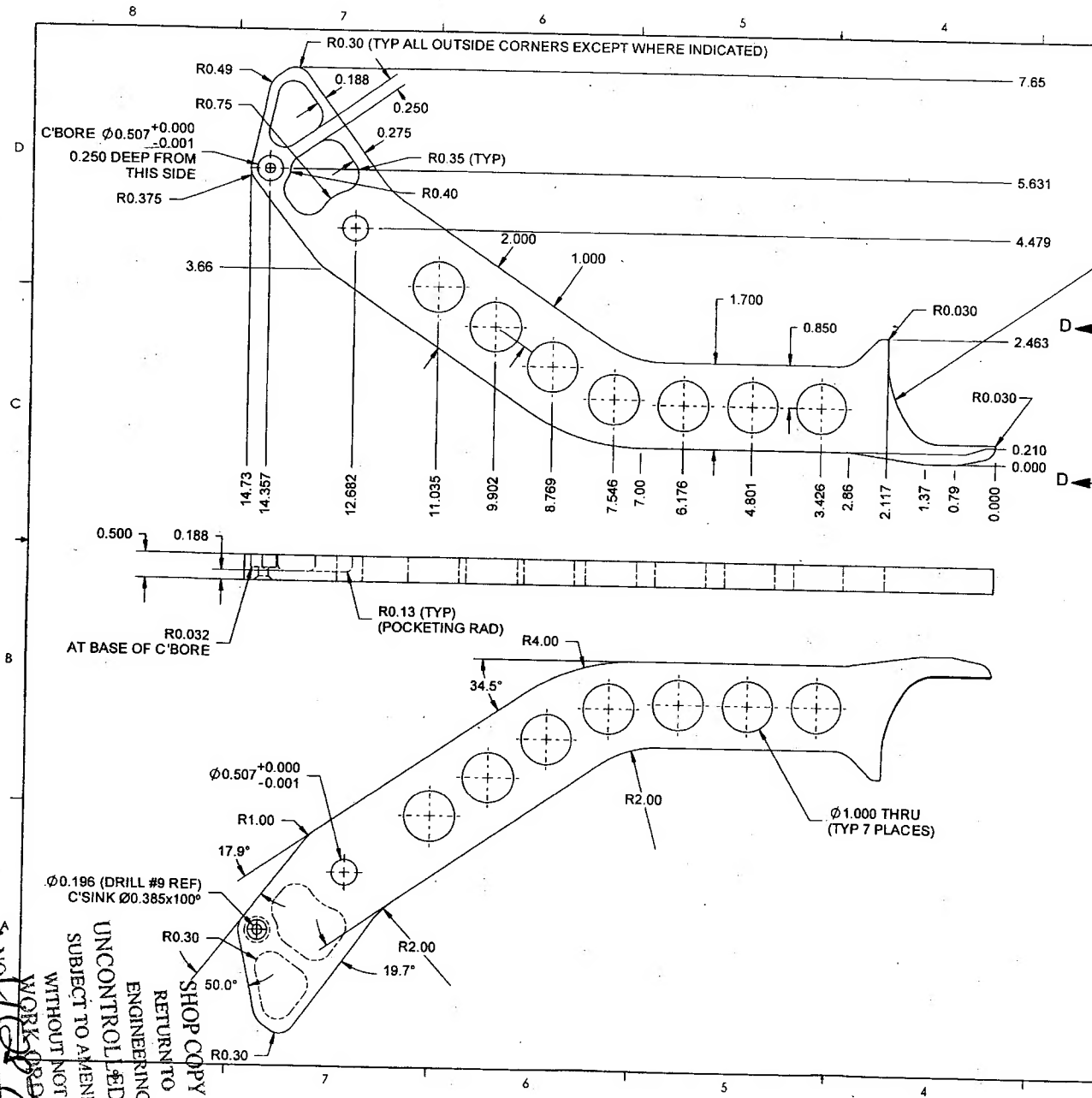
- NOTES:**
- 1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR PER AMS-QQ-A-200/8 (OR AMS 4160) (REF. DART SPEC. M6061T6B0.500)
 - 2) FINISH: NONE
 - 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
 - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
 - 5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
 - 6) IDENTIFICATION: N/A
 - 7) WEIGHT: 1.05 lbs



RELEASED
07.12.11

DESIGN	DC	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	DC	DRAWING NO. D3560	REV. D
CHECKED	DC	SHEET 2 OF 5	
MFG. APPR.	DC	TITLE ARM WELDMENT	SCALE 1:2
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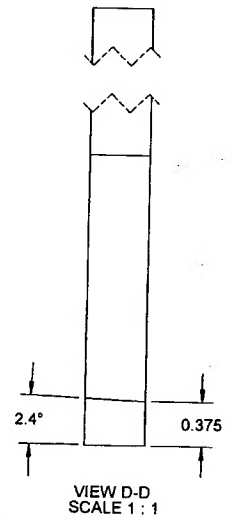
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WORK ORDER
NO. 41287



PROFILE TO MATCH
D3592-1 PLATE,
MACHINE AT 2.4°,
SEE VIEW D-D

D3560-2 ARM

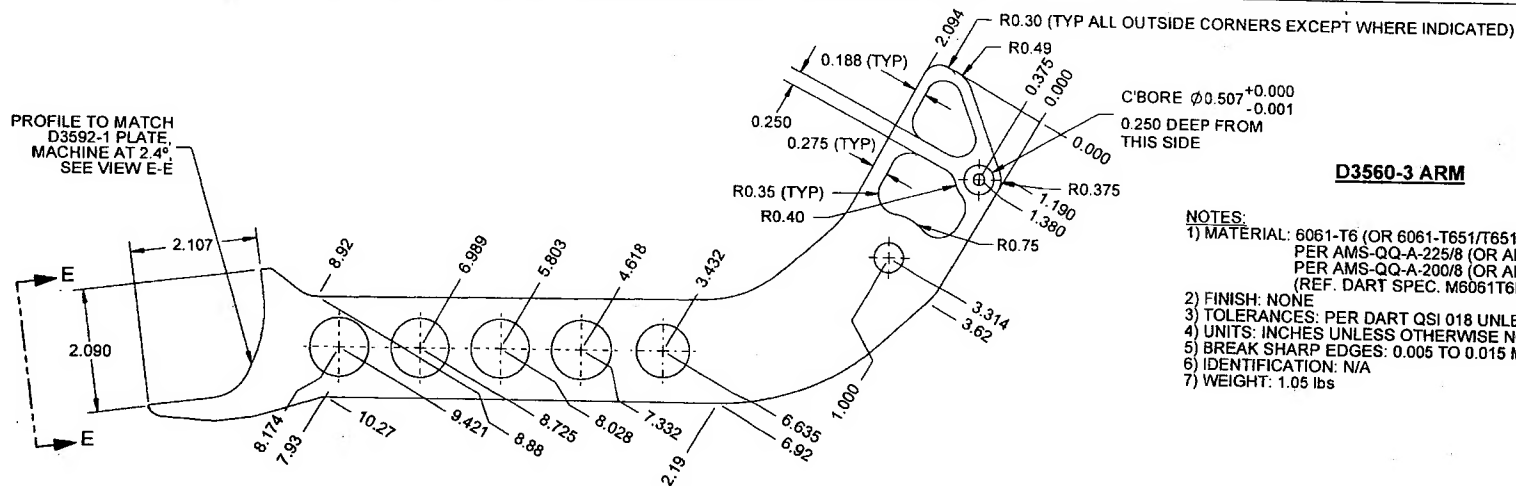
- NOTES:
- 1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK
PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR
PER AMS-QQ-A-200/8 (OR AMS 4160)
(REF. DART SPEC. M6061T6B0.500)
 - 2) FINISH: NONE
 - 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
 - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
 - 5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
 - 6) IDENTIFICATION: N/A
 - 7) WEIGHT: 1.05 lbs



DESIGN	92	DART AEROSPACE LTD	
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MFG. APPR.	JE	D3560	SHEET 3 OF 5
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DE APPR.	AMP	ARM WELDMENT	1:2
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PROFILE TO MATCH
D3592-1 PLATE,
MACHINE AT 2.4°
SEE VIEW E-E



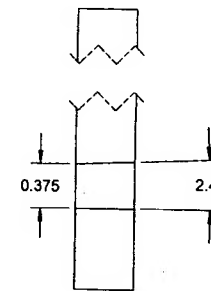
D3560-3 ARM

NOTES:

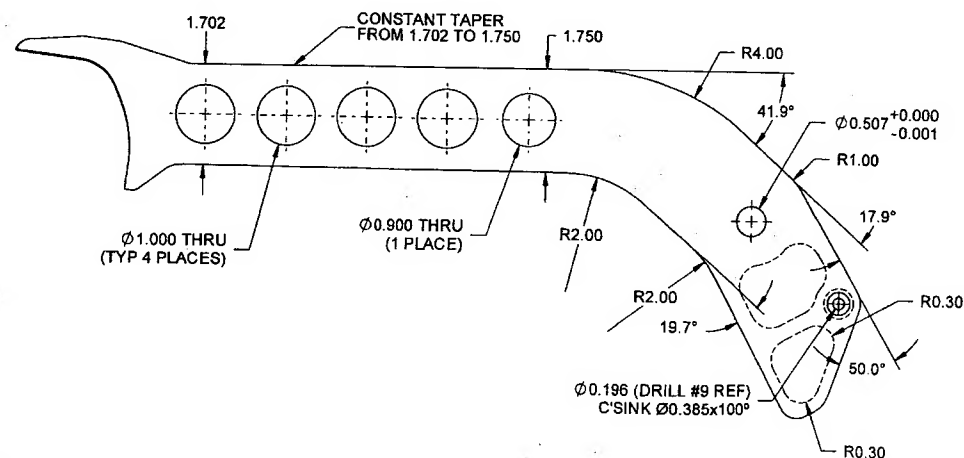
- 1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK
PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR
PER AMS-QQ-A-200/8 (OR AMS 4160)
(REF. DART SPEC. M6061T6B0.500)
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
- 6) IDENTIFICATION: N/A
- 7) WEIGHT: 1.05 lbs

R0.13 (TYP)
(POCKETING RAD)

0.188
0.500
R0.032
AT BASE OF C'BORE



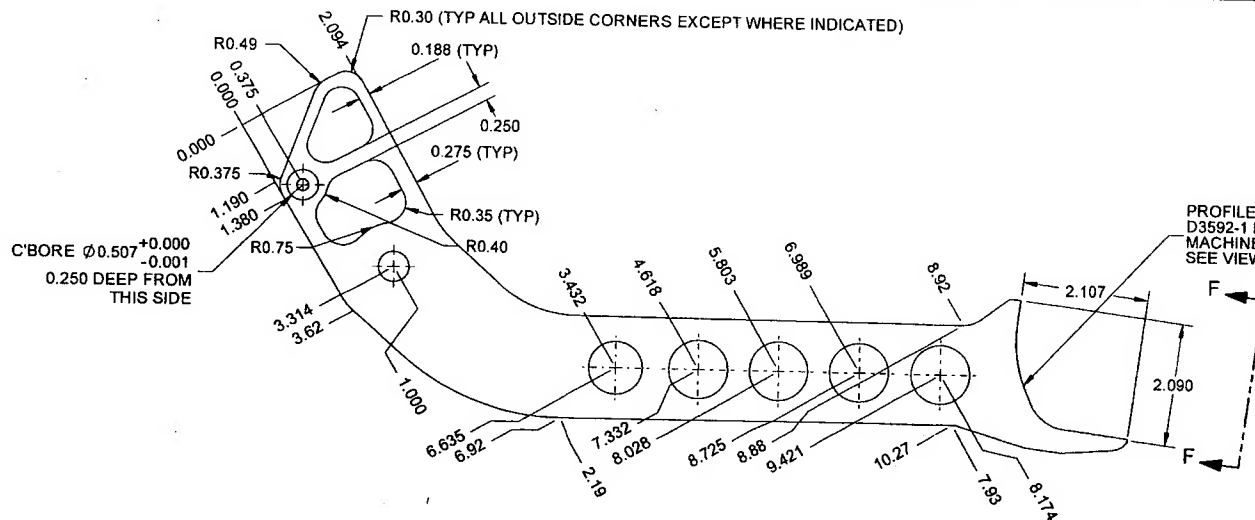
VIEW E-E
SCALE 1:1



RELEASED
67.12.14

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CHECKED	JP	DRAWING NO.	REV. I
MFG. APPR.	JP	D3560	SHEET 4 OF 5
APPROVED	MD	TITLE	SCALE
DE APPR.	JP	ARM WELDMENT	1:2
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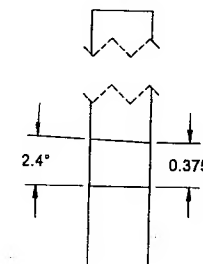
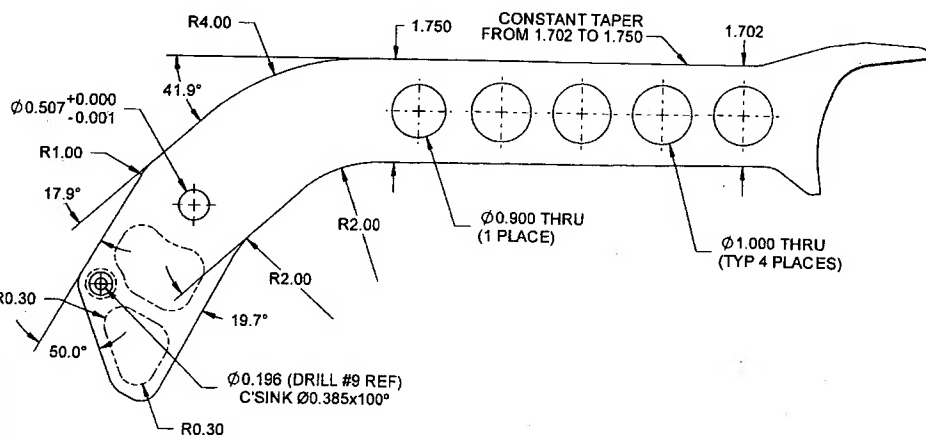
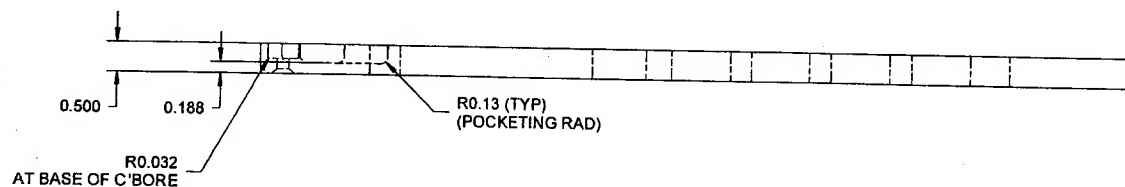
C'BORE $\varnothing 0.507^{+0.000}_{-0.001}$
0.250 DEEP FROM
THIS SIDE

PROFILE TO MATCH
D3592-1 PLATE,
MACHINE AT 2.4°,
SEE VIEW F-F

D3560-4 ARM

NOTES:

- 1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK
PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR
PER AMS-QQ-A-200/8 (OR AMS 4160)
(REF. DART SPEC. M6061T6B0.500)
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
- 6) IDENTIFICATION: N/A
- 7) WEIGHT: 1.05 lbs



VIEW F-F
SCALE 1:1

RELEASED
67.12.18.17

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DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. D
MFG. APPR.		D3560	SHEET 5 OF 5
APPROVED		TITLE	SCALE
DE APPR.		ARM WELDMENT	1:2
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From: David Shepherd [mailto:dshepherd@dartaero.com]
Sent: September 10, 2008 1:36 PM
To: 'Alan Stocker'
Cc: 'Chris Provencal'; 'Mike Petsche'; 'Bill Beckett'; 'Susanne Sheldon'
Subject: RE: D3560-044 & -042 Cracking

Alan,

Thanks for the pictures.
I am not comfortable with any sort of repair to these parts.
I think that all 14 parts should be scrapped.
And, at the risk of stating the obvious, we need to revisit the manufacturing process of this joint.
My preference, as it was a couple of years ago, is to eliminate this weld.
However, the geometry in that area is a little tricky.
Suggest we generate an NCR or PAR or whatever.

David

From: Alan Stocker [mailto:astocker@dartaero.com]
Sent: Wednesday, September 10, 2008 10:26 AM
To: 'David Shepherd'
Cc: 'Chris Provencal'; 'Mike Petsche'
Subject: D3560-044 & -042 Cracking

Good morning,

We have 13x D3560-044 and 1x D3560-042 that have cracks all but 1 in the same location.
Attached image D3560-044 Crack 1 shows where 13 of the 14 cracks occurred. D3560-044
Crack 2 shows where the other crack occurred. The cracks shown in D3560-044 Crack 1 vary in
depth from roughly 3/32 to 1/2 inch. I discussed this with Chris and Peter the consensus opinion is
the parts are scrap. Further discussion with Chris indicates that changing grain direction to 45
degree on the sheet metal part may lower the scrap rate but not eliminate it. This has been done
on a previous deviation with a less scrap. D3560-044 Crack 2 appears to just be an anomaly.

Please disposition all 14 parts.

Regards,

Alan Stocker
Mechanical Designer

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, Ontario
CANADA K6A 1K7

Phone: 613 632 5200 x 241
FAX : 1 613 632 5246

astocker@dartaero.com